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Studies on the establishment of connections among spoken statements: what can they contribute to the promotion of students' construction of a coherent discourse representation?

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ABSTRACT

The aim of this article is to provide an overview of how the establishment of discourse connections among spoken statements has been studied by approaches to discourse analysis and psycholinguistic studies, in order to highlight what variables appear to be important for understanding how comprehension of spoken discourse can be facilitated. The consideration of discourse analysis approaches allows us to think about the role of the establishment of discourse connections among speech acts in the classroom, the uses of contextualization cues by bilingual students, the identification of social and cultural notions in teachers' discourse, and the interactional effects of teachers' interventions. Preliminary psycholinguistic studies contribute to our understanding of the role of establishing causal connections and integrating adjacent statements through the presence of discourse markers in the comprehension of spoken discourse by college students. The results of these approaches and studies provide insight into students' comprehension of classroom discourse, and hold the potential for implications for instruction.

Estudios acerca del establecimiento de conexiones entre enunciados hablados: ¿qué pueden contribuir a la promoción de la construcción de una representación coherente del discurso por parte de los estudiantes?

Palabras clave:
Comprensión
Discurso en el aula
Marcadores del discurso
Conexiones causales

RESUMEN

El propósito de este artículo es realizar un recorrido a través de enfoques de análisis del discurso y estudios de psicolingüística que han investigado el establecimiento de conexiones entre enunciados hablados, a fin de destacar las variables que parecen ser centrales para facilitar la comprensión. La consideración de los enfoques del análisis del discurso nos permitirán pensar acerca del rol del establecimiento de conexiones entre actos del lenguaje en el aula, las funciones de las claves de contextualización, la identificación de las nociones sociales y culturales en el discurso de los profesores, los efectos de las intervenciones de los profesores en la interacción con los estudiantes. Los estudios preliminares de psicolingüística contribuirán a nuestra comprensión del rol del establecimiento de conexiones causales e integración de enunciados adyacentes a través de marcadores del discurso por parte de estudiantes universitarios. La consideración de estos enfoques y estudios nos ayudarán a pensar acerca de las contribuciones que sus propuestas y métodos pueden hacer al enriquecimiento de nuestro entendimiento de cómo los estudiantes comprenden el discurso producido durante las clases.

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The comprehension of spoken discourse is crucial to student learning (Waring, 2013; Stubbs, 1976). That is, classes are taught through the spoken discourse of the teacher or professor, and his or her verbal interaction with the students (Robinson, Sterling, Skinner & Robinson, 1997; Stubbs, 1976). As a consequence, it is important to study how its comprehension can be facilitated. This article aims to underline the contribution that investigating the establishment of connections among spoken statements can make to this issue. With this aim, we will describe how this topic has tended to be examined by bringing together approaches to discourse analysis and some of their applications to Education in different cultural backgrounds, and psycholinguistic studies on the role of causal connectivity and discourse markers presence in the comprehension of spontaneous spoken discourse by college students. This overview will allow us to present some of the conclusions that have been reached so far with learners that speak different languages, and possible contributions that these approaches and studies can make to the investigation of how students' construction of a coherent discourse representation can be facilitated. It will also allow us to propose what seem to be useful directions for the future, as a tool to continue addressing the unique aspects of spoken discourse comprehension.

Establishing Discourse Connections

The establishment of connections among written or spoken statements is necessary for the construction of a coherent discourse representation (Louwerse & Mitchell, 2003; Mulder & Sanders, 2012; van den Broek, 1990, 1994, 2010; van Dijk & Kintsch, 1978; Zwaan & Rapp, 2006). In particular, the establishment of causal connections and local connections through the presence of discourse markers seem to facilitate the integration of discourse ideas, which promotes the generation of inferences. Inferences involve the activation of information that is not explicitly mentioned in a text but necessary for its comprehension (Singer, 1993; Singer & Halldorson, 1996; van den Broek, 1990, 1994). A causal connection between events A and B is established when the listener or reader perceives the event described in statement A to be temporally prior to, operant or active during, and necessary in the circumstances for the event described in statement B (Mackie, 1980; Trabasso, Secco, & van den Broek, 1984). Discourse markers are words or short phrases (such as *because, but, and*) that link two adjacent statements, and specify how to connect them (Halliday & Hasan, 1976; Knott & Sanders, 1998; Sanders & Noordman, 2000; Sanders, Spooren & Noordman, 1992). The role of these variables has been studied mainly in relation to the comprehension of written discourse (Cevasco, in press; Cevasco & van den Broek, 2013; Ferreira & Anes, 1994; Speer & Blodgett, 2006; Zwaan & Rapp, 2006). Comparatively, there has been less attention to their role in the comprehension of spoken discourse, such as the discourse involved in the interaction between teachers and students during the teaching of classes. This gap is important, given that there are differences between written and spoken discourse that could lead to differences in their processing. For example, spoken discourse is usually produced in response to the immediate situational demands (Stubbs, 1983), whereas written discourse is usually planned in advance (Ferreira & Anes, 1994; Fox Tree & Clark, 2013; Stubbs, 1980). Therefore, it is common for speakers to produce speech errors that need to be repaired by the listeners (Fox Tree, 1995). At the same time, spontaneous speech is enriched through information delivered non-verbally (such as intonation, pitch, and speech rate) which contributes to the coherence of the verbal message (Chafe, 1994; Gunraj & Klin, 2012). This information cannot be delivered through written discourse. Another difference is that written language allows the comprehender to apply strategies such as skimming, reading in a different order, and rereading, whereas spoken discourse has to be processed at the rate that it is produced by the speaker (Ferreira & Anes, 1994; Stubbs, 1980).

Research on spontaneous speech comprehension has tended to focus on listeners' ability to predict, detect, and manage disfluencies (Brennan & Schober, 2001; Fox Tree, 1995; Lickley & Bard, 1998), and the processing of prosodic cues (Schafer, Speer, Warren, & White, 2000; Kraljic & Brennan, 2005). Little is known about the comprehension of spoken discourse beyond these topics.

The establishment of discourse connections among spoken statements has tended to be examined by discourse-analysis approaches, which have looked for units, recurrent patterns and rules in transcripts of spoken discourse, and by some preliminary psycholinguistic studies that have focused on the role of causal connectivity and discourse markers in the comprehension of spoken discourse. The aim of this article is to provide an overview of the contributions that these approaches and studies can make to the promotion of student learning, by highlighting variables that seem to facilitate comprehension and therefore need to be examined in more depth by future studies. First, we first describe how discourse analysis approaches (such as speech act theory, interactional sociolinguistics, ethnography of communication and conversation analysis) have looked for discourse connections in excerpts of spoken discourse, and give examples of how they have been applied to the examination of teacher and student discourse. Next, we will describe psycholinguistic studies that have focused on the establishment of causal connections and adjacent connections through the presence of discourse markers by college students.

Approaches to Discourse Analysis: Applications to Educational Settings

Discourse-analysis approaches have applied the methodology and theoretical principles of linguistics to the study of discourse, allowing us to discover rules and recurrent patterns in spontaneous spoken discourse transcripts (Levinson, 1983; Stubbs, 1983; van Dijk, 1997). The aim of these approaches is to capture the organization of the discourse that is involved in spoken interchanges (Stubbs, 1983). Speech act theory, interactional sociolinguistics, ethnography of communication and conversation analysis are examples of these approaches.

Speech act theory focuses on the communicative acts performed through speech. It proposes that some declarative sentences are not used with the intention of making true or false statements, but rather to do things (Austin, 1962). Searle (1969) classified them in five classes: *representatives*, which commit the speaker to the truth of the expressed proposition (e.g. asserting); *directives*, which represent attempts by the speaker to get the addressee to do something (e.g. requesting); *commissives*, which commit the speaker to some future course of action (e.g. promising); *expressives*, which express a psychological state (e.g. thanking); and *declarations*, which effect immediate changes in the institutional state of affairs and tend to rely on extra-linguistic institutions (e.g. appointing). Speech act theory provides useful tools for identifying the underlying speech acts that are being performed during a class, and for understanding how each of the teachers' and students' statements create an environment of expectations in which the next speech act will or will not be appropriate (Schiffrin, 1994). In other words, by establishing how speech acts initiate and respond to other speech acts, we can identify discourse connections between teachers' and students' statements. The proposals of this approach have been applied to the study of direct and indirect speech acts in second language learning. Direct speech acts are performed when a speaker makes a literal utterance that performs an illocutionary act. In this case, there is semantic congruence between what is said and what is performed. For example:

Student 1: May I look at your English worksheet?
Student 2: No. (Direct Refusal)

Indirect speech acts are performed when a speaker produces a literal utterance that constitutes a secondary illocutionary act that differs from the primary illocutionary act. For example:

Mei Mei: Teacher, may I go out?

Teacher: After finishing this part. (Indirect Refusal)

Whereas most studies on this topic have focused on adult L2 learners (Bouton 1999; Holtgraves 2007; Taguchi 2007, 2008), Lee (2010) examined their identification by seven, nine and twelve year-old Hong Kong elementary students of English. She presented them with short dialogues between teachers and students, containing direct and indirect speech acts. The students were then asked to indicate what the speaker meant by selecting one of several provided statements. Results indicated that children were able to select the correct statement for direct speech acts relatively well, but seven and nine-year-olds had difficulty comprehending indirect speech acts such as refusals, compliments and complaints. The results of retrospective verbal protocols suggested that these groups tended to rely on the literal meaning of the utterance, whereas twelve-year olds were more able to rely on speaker intention. In other words, there may be discourse connections that seven and nine- year-old children are not able to establish in their second language, particularly when the connections involve indirect speech and hence need an inference. An interesting question that the author proposes for future studies is to what extent the comprehension of indirect speech acts can be facilitated by emphasizing the teaching or practice of these sample situations during school instruction in L2.

Interactional sociolinguistics focuses on the interpretation of verbal and non-verbal signals during face to face interaction (Gumperz, 1982). This approach proposes that participants need to share background assumptions about interactive goals and interpersonal relations in order to infer the meaning of an interaction, and to determine what is expected of them (e.g. chat to pass the time, exchange anecdotes, explore particular issues, etc.). Once participating in an interaction, speakers need to signal that they are involved. They accomplish this through '*contextualization cues*', which are aspects or language and behavior that relate what is said to the contextual knowledge needed to infer what is meant (e.g., intonation, choice among lexical options, etc.). To study these cues, interactional sociolinguists record meetings and classes, and reconstruct the underlying signaling cues and assumptions that lead to the success or failure of communication (Gumperz, 1982; Schiffrin, 1994; van Dijk, 1997). For example:

Teacher: *Can you guess what this word means?*

Student: *I don't know.* (the answer is produced with rising intonation)

Teacher: *Then, who can guess the meaning of this word*?

In this example proposed by Gumperz (1982), the student produces the answer with rising intonation which represents a contextualization cue that indicates a need for further support. Yet, the teacher misinterprets the cue as unwillingness to answer the question, and communication fails. This approach has also been applied to the study of code-switching as a contextualization cue in the bilingual preschool (Prego, 2006). Code-switching involves the juxtaposition of two different languages in the context of a single conversation (Gumperz, 1982). Studies on this topic have tended to focus on the use of the contextualization cue by adults (Fernandez, 2006). To examine the functions of code-switching by three and four-year-old pre-school students in a Spanish pre-school, Prego-Vázquez (2006) analyzed taped interactions between teachers and students (involving story-reading, spontaneous conversation or picture description). The author suggested that at this age children are developing their narrative skills, and begin to adopt a multiplicity of voices when they participate in a spoken interaction. For example, they can now take the role of narrator, author or character of a story (Aukrust, 2004; Ely & McCabe 1993). The transition from one role to the other in a conversation needs to be signaled. In the case of bilingual children, this shift can be indicated by code-switching. For example:

Interviewer: Have you watched or read the Lion King? (in Galician).

Student: I've seen the movie and read the story (in *Galician*).

Interviewer: What did Scal do to the Lion King? (in Galician).

Student: He threw him off a cliff (in Spanish).

Interviewer: Did he die? (in Galician).

Student: yeah, but then Simba decided to hide... (in Spanish).

The author proposes that when this student takes the role of participant of the conversation, he speaks Galician. When he takes the role of narrator to recreate the story, he mainly uses Spanish. Thus, the choice of Spanish allows him to create a break or discontinuity with the role of participant of the conversation, and shift to the role as a narrator. Based on this analysis, the author suggests that code-switching is not a consequence of a deficit in linguistic competence as had been proposed before (Weinrich, 1953), but rather an additional strategy that children can use in crucial points of bilingual conversation to highlight particular sequences. In summary, through the tools provided by interactional sociolinguistics we can analyze bilingual children's discourse in order to observe their developing narrative skills.

Ethnography of communication is interested in patterns of communication as part of our cultural knowledge and behavior (Schiffrin, 1994). This approach proposes that language use is governed by social norms that specify participant roles, permissible topics, and so on (Gumperz, 1982), and that we can study spoken discourse by analyzing it through the SPEAKING framework (Hymes, 1972). This framework proposes that the dimensions of communicative events include: setting ('occasion', physical circumstances), participants (speakers, hearers, overhearers), ends (goals), act sequence (form and content of the messages), key (tone, manner), instrumentalities (verbal and non-verbal channels), norms of interaction and interpretation (cultural interpretation of norms) and genre (textual categories). One way in which ethnography can be applied to education is by interviewing and taping key informants' discourse (for example, teachers or students), and analyzing dimensions of the communicative event and discourse connections in its transcripts (De Tezano, 2002; Velasco & Díaz, 1999). Bigott (2007) applied this approach to study Venezuelan elementary school teachers' cultural and social conceptions about educational technology, as a tool to examine their willingness to use it in the classroom. To explore this, the author conducted individual and collective interviews (speech events), with two teachers that had worked at a Venezuelan elementary school for several years. The aim of the interviews was to elicit their individual experience with technology in the classroom, and their social and cultural views on this issue. By analyzing the act sequences in these interviews, the author was able to identify descriptive categories (following Martínez, 1991, and Strauss & Corbin, 2002) and to establish discourse connections among the teachers' statements. This analysis suggested that the teachers felt that the incorporation of technology made their role less central:

Teacher 1: *The kids seem to know better than we do how to use the computer.*
They have been using it since they were little, unlike us who are learning just now.

They also associated the use of the internet with extra work :

Teacher 2: *Using the internet in the class involves more work for me. I have to figure out how to use it, spend a lot of time searching for information on this.*

and with non-academic activities:

Teacher 1: *We need to consider that children use the internet to play games, and that this takes time away from the class.*

Based on the recurrent topics of these transcripts, the author concludes that these teachers think of technology as something that takes the power away from them and gives it to the student. Also,

they seem to associate the incorporation of technology with an increasing amount of work for them, and with students engaging in activities that have a negative impact on learning. In summary, by examining teachers' discourse through this approach, one can establish their notions on educational issues, and think of possible interventions to increase their willingness to incorporate new educational tools.

Conversation analysis examines spoken discourse as a source of social organization. It proposes that speakers share methods for recognizing and organizing their own and other persons' conduct, which allows them to maintain a sense of social normalcy (van Dijk, 1997). Three assumptions are central to this approach: there is structural organization to interaction, contributions are oriented by context, and no detail of interaction can be dismissed a priori as irrelevant or accidental. An example of structural organization is the adjacency pair. These are pairs of utterances that are positioned adjacently and produced by different speakers. Speaker A produces the first part (e.g., greeting), followed by speaker B producing the second part of the pair (e.g., greeting; Schegloff & Sacks, 1973). Thus, each statement is shaped by a prior statement (for example, a summons) and provides a context for a next statement (for example, an account; Schiffrin, 1994). Conversation analysts search for recurring patterns across transcripts of naturally occurring conversations, and identify discourse connections among the speakers' statements. They work with tape-recorded interactions, and reproduce linguistic (such as pronunciation) and non-linguistic details (such as taking a breath or a sigh) in their transcripts (Levinson, 1983; Schiffrin, 1994). Some conversation analysis studies have looked at classroom management (Seedhouse, 2004; Waring, 2013). Waring and Hruska (2011) applied this approach to analyze a novice English speaking teacher's management of a bilingual (Spanish-English) elementary students' resistance to involve in a tutorial session. Gaining and maintaining engagement is crucial for teachers, given that shortly after engagement they must frequently disengage students in order to engage them in a new task (Acheson & Gall, 2003; Nolan & Hoover, 2008). During these transitions, it is possible to lose their attention. When analyzing this particular interaction, the authors identified three main stages: establishing compliance, focusing inquiry, and settling procedural matters. Establishing compliance involved teacher's statements in which she established that the previous task was closed, and a new segment was about to begin. Focusing inquiry involved statements in which the teacher prompted the student to concentrate on a specific task. Settling procedural matters entailed teacher's statements in which she introduced preparatory activities, such as distributing markers, boards, erasers. In the following example, throughout this interaction the student shows resistance by making distracting moves such as whiney gestures, disengaging gaze, etc. To manage this behavior, this teacher seeks to align with the student's world, maximize her participation, and mitigate opposition:

Teacher: I brought my very own markers today. Want blue or black?
Student: Black.
Teacher: Here's your eraser.
Student: My eraser or your eraser?
Teacher: That's for both of us. Can you share anything… can we share?
Student: Yeah.
Teacher: What do you think we're going to do today?
Student: We are gonna write manatee.
Teacher: You wanna try and learn manatee?
Student: Yeah.
Teacher: So what do you wanna spell first?
Student: Manatee.

By considering the discourse connections between the teacher's and the student's statements, it appears that the teacher tends to offer the student with choices ('*Want blue or black?', 'Can you share?', 'What do you wanna spell first?*'), which have a positive effect on the student, such that she agrees to participate in the proposed tasks ('*Yeah', 'We're gonna write manatee*'). Another example of this can be observed when the teacher turns something already settled (the spelling task) into an issue that the student is asked to decide (*You wanna learn manatee?*). By doing this, the teacher creates the illusion that the student has control over these curricular matters, instead of imposing them on her. In summary, a recurring pedagogical practice that this teacher employs is to engage the student and promote her cooperation, by getting her involved in decision-making. This analysis allows us to reflect on the important effects that teachers' interventions can have on students' willingness to engage in different lesson tasks. It would be interesting for future studies to look at more excerpts and identify teachers' interventions that result in students' involvement and cooperation as well as those that result in disengagement.

To sum up, the consideration of discourse-analysis approaches allows us to consider the role of speech acts, contextualization cues, teachers' cultural and social notions and the interactional effects of teachers' interventions. Yet, they do not focus on students' establishment of discourse connections, which are necessary for the construction of a coherent discourse representation. Next, we will present psycholinguistic studies that have investigated this issue.

Psycholinguistics Studies on Spoken Discourse Comprehension: the Role of Causal Connections and Discourse Marker Presence

As mentioned in the introduction, prior research has shown that the establishment causal connections and integration of ideas through the presence of discourse markers have an important role in discourse comprehension.

Causal Connectivity

One of the most consistent findings in studies on written discourse comprehension is that it involves the comprehender's identification of causal relations between text elements (Mulder & Sanders, 2012; van den Broek, 1990, 1994, 2010; Zwaan & Rapp, 2006). Evidence shows that events with many causal connections are recalled more often than events with few connections (Fletcher & Bloom, 1988; Goldman & Varnhagen, 1986; Trabasso & van den Broek, 1985), rated as more important (Trabasso & Sperry, 1985), more often included in summarization protocols (van den Broek & Trabasso, 1986), and retrieved more quickly (O'Brien & Myers, 1987).

In order to examine the role of causal connectivity in the comprehension of spontaneous spoken discourse materials, Cevasco and van den Broek (2008) used the network theory of discourse representation (Trabasso & Sperry, 1985) to parse an excerpt of a radio transmission in English (on the topic '*Racism and everyday language*') into causes and consequences expressed in the announcers' statements. Considering previous studies on written discourse, they expected statements that had many causal connections to other statements to be recalled more often than statements with fewer connections. To test this hypothesis, they asked U.S college students to either listen to the excerpt of the transmission or to read its transcript, and to perform a free recall and a question-answering task afterwards. Results showed that the more causally connected statements were better recalled and more often included in answers to questions about the materials than the less causally connected statements. This was the case when the radio transmission was presented in either oral or written formats. These results suggest that listeners appear to rely on processing the causal interconnections between a speaker's statements to derive a coherent representation of discourse in memory. Those statements that have more causal connections seem to make a greater contribution to this representation and to be more easily accessed when comprehenders are required to retrieve or answer questions about what a speaker said.

A second study examined the interplay between the causal connectivity of the statements and their presentation in a single or dual modality (Gaviria & Cevasco, 2012). The authors presented a group of Colombian college students with an excerpt of a radio interview to a Colombian writer. There were four presentation conditions: reading, listening, reading-listening, and listening-reading. In the reading condition, students read the transcript of the interview. In the listening condition, they were asked to listen to its audio. In the listening-reading condition, participants were asked to listen to the first half of the interview and to read the transcript of the second half. In the reading-listening condition, participants read the transcript of the first part and listened to the second part of the materials. After this, all students were asked to perform a free recall task. A causal network for the transmission was derived following Trabasso & Sperry (1985). Results indicated once again that statements with many causal connections were more often recalled than those with fewer connections, and those students who received the discourse in a dual modality condition (listened-read or read-listen) recalled more statements than those who either read or listened to the excerpt. Finally, the role of causal connectivity was greater for the dual modality conditions than for the single modality conditions. These results suggest that the causal connectivity of spoken statements has a role in the comprehension of interviews, and that being able to both listen and read provides the comprehender with the opportunity to benefit from the characteristics of both spoken and written discourse. For example, the benefit may derive from the fact that they are able to process at least one part of the excerpt at their own peace and re-read sections, and also to process the non-verbal information that is delivered through spoken discourse for the other part.

The role of causal connectivity of spoken statements was also examined in relation to the comprehension of students that are actual participants in the spoken interaction. Cevasco & Muller (2009) asked Argentinian college students to listen to a short narrative, and then to take part in a small-group conversation that required them to recall the story together. Following Muller & Hirst (2010) half of the participants received the story with a drawing that made it more coherent, and half did not. After participating in the conversation, students were asked to perform an individual free-recall task. A causal network was created for the original story and for each group conversation to allow identification of the number of causal connections of each statement. Thus, the total number of connections of each statement included those that were established by the story as well as additional connections that had been established during the group conversation. Results indicated that those statements that had many connections were better recalled that those that had fewer connections, and that the students who had received the story with the drawing recalled more statements than those who had not. This study provides preliminary evidence that the causal connectivity of spoken statements also has a role in the comprehension of students who participated from the spoken interaction, as does the quality of the representation that they constructed of the topics that are discussed.

Discourse Markers

Discourse markers are words or short phrases (such as *because, and, but*) that specify how to conceptually link two adjacent statements (Halliday & Hasan, 1976). Millis and Just (1994) propose that their presence reactivates the contents of the first statement when the reader finishes reading the second one, leading to the formation of an integrated representation.

The role of connectives in the construction of a coherent discourse representation has been studied mostly in the context of reading situations. These studies have shown that the reading time for a statement following a connective is faster compared to when no connective is present (Golding, Millis, Hauselt & Sego, 1995; Maury & Teisserenc, 2005; Millis & Just, 1994; Sanders & Noordman, 2000), and that semantically appropriate connectives lead to faster reading times on the postconnective statements than semantically inappropriate connectives (Murray, 1997). Connectives also appear to benefit comprehension by facilitating the recall of statement pairs (Caron, Micko & Thüring, 1988; Golding et al., 1995), by decreasing answer times to comprehension questions (Millis & Just, 1994; Noordman, Vonk & Kempff, 1992), and by increasing the activation of causally based inferences (Millis & Just, 1994; Millis, Golding & Baker, 1995; Millis & Magliano,1999; O'Reilly & McNamara, 2007; Segal, Duchan, & Scott, 1991).

There have been a small number of studies on the role of connectives in the comprehension of spoken discourse. Groen, Noyes and Verstraten (2010) presented English-speaking college students with excerpts of telephone conversations, and asked them to identify the excerpts that they believed indicated that speakers' goals were being achieved. These conversations involved markers such as '*so*', '*well*' and '*but*'. The results indicate that listeners tended to select the statements that surround the discourse markers, indicating that their presence had contributed to the establishment of coherence in the conversation.

Fox Tree and Schrock (1999) investigated the role of the discourse marker '*oh*' in the processing of conversations. This marker has been proposed to signal a change of state (Schiffrin, 1987). That is, *oh* allows the speaker to indicate that he or she will correct a previous statement, and introduce new information. The authors asked U.S. college students to listen to the materials, and to perform a word-monitoring task. This task required them to listen to the excerpts with a target word in mind, and to press a button if they heard it. Results indicated that hearing '*oh*' facilitates students' recognition of words that were part of the statements that preceded and occurred after the marker. That is, they make it easier for the listener to establish discourse connections between the statements that precede or follow the change of state signalled by the marker.

Other studies examined the effect of discourse markers on the comprehension of non-native students. Flowerdew & Tauroza (1995) presented Chinese-speaking college students with videotaped engineering classes in English. In the original version, the classes included discourse markers (*all right, and, because, but, now, OK, right, so, then*, and *well*). In the edited version, the discourse markers had been eliminated. Students were asked to write summaries and answer to comprehension questions about the class. Results indicate that they wrote better summaries and provided more correct answers to comprehension questions when the class was presented with its original discourse markers than without them. Similarly, Jung (2003) found that Korean college students recalled better an English class when it was presented with all its original discourse markers than without them.

The above studies on students' establishment of discourse connections among spoken statements provide insights into how they construct a coherent discourse representation. Still, it is important to point out that they have not focused on materials that involve teacher-student or student-student interaction, nor on students of different ages, like discourse-analysis approaches have.

Conclusions

The aim of this article was to present an overview of research on the establishment of connections among spoken statements, and outline how the results of these investigations can contribute to our understanding of students' construction a coherent discourse representation and of possible ways to foster such construction. With this aim, we described approaches to discourse analysis and some of their applications to education, and psycholinguistic studies on the role of causal connectivity and discourse markers in spoken discourse comprehension by college students.

The consideration of approaches to discourse analysis (speech act theory, interactional sociolinguistics, ethnography of communication and conversation analysis) allowed us to revise some of the variety of tools that they have applied to the identification of discourse connections in transcripts of spoken interactions. Speech act theory allows the examination of the discourse connections that are established among teachers and students' speech acts produced during a second language learning class, and the importance of students' age in their ability to establish them. Interactional sociolinguistics provides tools to interpret and analyze the functions that contextualization cues such as code-switching can serve in the bilingual classroom, and how they can provide resources to observe children's developing narrative skills. Ethnography of communication provides tools to examine global dimensions of communicative events, such as participants, ends, norms of interaction. This allows one to analyze teachers' discourse, in order to identify recurrent themes on their notions on educational issues and the effects that they can have on their willingness to incorporate new tools in the classroom. Conversation analysis allows us to examine teachers' and students' statements in order to observe the effects that teachers' interventions can have on students' engagement and willingness to involve in different tasks.

Together, these approaches view excerpts of spoken discourse from different angles and consider different characteristics of spoken interaction. These theoretical perspectives are complemented by psycholinguistic studies that address the question of whether students are able to establish the discourse connections that are essential for the construction of a coherent representation of these excerpts. Examining these issues is important, giving that the comprehension of teachers' discourse and teacher-student interaction is essential for student learning.

Psycholinguistic studies have focused on the role of the establishment of causal connections and integration of adjacent statements through the presence of discourse markers by college students. Their results suggest that the causal connectivity of the statements has an important role in their probability of being recalled and included in answers to questions about spontaneous discourse materials such as radio broadcasts or group conversations, both when students listened to the interactions and when students listened to and participated in the interactions. One observation is that discourse markers have an important role here as well. Their presence appears to facilitate listeners' identification of statements that indicate that speakers' goals are being achieved, the integration of statements that involve a change of state, and the writing of summaries and question-answering about classes taught in a second language by college students.

The consideration of these approaches and studies can have applications for educators. Teachers can take into account their students' age in order to examine if they can expect them to comprehend indirect speech acts, for example, and whether they can facilitate their comprehension by practicing sample situations during the class. Knowing that code-switching is not a deficit, but rather an extra tool that is available for bilingual children suggests that it is important for teachers to allow them to produce this switch while participating in the class, and that examining students' alternation between languages can help them assess their developing narrative skills. The availability of tools to examine teachers' notions on educational issues is useful for thinking about their role in their willingness to incorporate new educational tools in the classroom, and for designing specific interventions directed at facilitating this incorporation when necessary. These tools could be applied to examine students' notions on different topics related to learning as well. Examining the interactional effects of teachers' interventions aimed at promoting student engagement can be also useful for the facilitation of student learning. That is, if we can establish what interventions tend to result in students' cooperation (for example, those that involve them in decision-making), then we can recommend teachers to include them, especially when dealing with students that disengage from the lesson tasks easily.

Psycholinguistic studies on spoken discourse comprehension can also provide insights for educators. Given that causal connectivity seems to have an important role on spoken discourse recall and question-answering, teachers can try to establish them while presenting the topics of the class, especially aiming to connect those statements that play a central role in the lesson, and the teacher wants to make sure that students are able to recall. Also, teachers can consider including discourser markers between spoken statements, given that this has also been found to promote recall and question-answering. The presence of discourse markers could be especially helpful when teachers are presenting an adversative connection between statements. This connection involves a contrast or cancellation of an expectation between the statements pair (Halliday & Hasaan, 1976), and has been found to be especially difficult to establish when not signalled (Flowerdew & Tauroza, 1995; Murray, 1997).

Future Directions

It would be interesting for future studies to combine the proposals of discourse-analysis approaches and the methods provided by psycholinguistics. For example, through these tools we could explore what representation of the speech acts that they listen to during a class do students who are beginning to identify indirect speech acts construct, and whether statements that represent indirect speech acts that have many causal connections are easier to comprehend than those that have fewer connections. Also, when a bilingual student alternates languages to change from a conversational frame to a narrative frame, we could explore whether students who are listening to him or her establish a coherent break at this point. In other words, while students are processing the discourse that other students produce, it would be interesting to measure if the introduction of contextualization cues that signal a discontinuity with the previous discourse result in previous statements becoming less active than those that occur after the discontinuity. This effect on comprehension could be measured by presenting students with classroom discourse materials that involve code-switching on the computer, and asking them to perform online tasks, such as lexical decision or naming to test the availability of words in L1 and L2. Students could also be asked to provide recall protocols on these materials, in order to examine whether they establish causal connections more easily among statements that are produced in the same language or if they establish connections just as easily among statements produced in different languages. When thinking about the analysis that ethnography of communication allows us to make of teachers' discourse, we can propose that it would be interesting to consider whether students establish causal connections among the statements that indicate teachers' social notions on the educational tools used in the classroom, in order to examine the effect that these could have on their own notions on this topic and their willingness to use them. It would also be useful to think about the proposals that conversation analysis has made about classroom management, in order to examine what representation students construct of teachers' pedagogical interventions directed at promoting engagement. For example, does the presence of discourse markers facilitate the transition between one lesson task and the next, by creating a break with the previous task? Some studies have proposed that project markers (such as *okay* and *all right*) can help mark a discontinuity, and coordinate transitions from one task to the next during telephone conversations (Bangerter, Clark & Katz, 2004). It is then possible that there are discourse markers (such as *okay* and *all right* for example) that, when introduced by the teacher, have this facilitative effect on students' comprehension.

Future studies could also consider the tools provided by other discourse analysis approaches (such as pragmatics, variation analysis, and so on), and the role of other constructs that have been examined by psycholinguistic studies on written discourse (such as motivation, intelligence, memory), in order to continue enriching our understanding of students' spoken discourse comprehension.

In conclusion, the consideration of the proposals of discourse analysis approaches allows one to think about how students may construct –or fail to construct- coherence in the context of spoken discourse in the classroom. The consideration of preliminary psycholinguistic studies on students' establishment of discourse connections allows one to explore the role that causal connectivity and discourse marker presence in the construction of this coherent representation. New studies that address the contributions that both these approaches and studies have made to our understanding of spoken discourse will continue to promote to our understanding of how student learning can be promoted.

Conflicts of interest

The authors of this article declare no conflicts of interest.

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